EXPLORING THE CONDITIONS FOR DECISIVE OPERATIONAL FIRES

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ABSTRACT

EXPLORING THE CONDITIONS FOR DECISIVE OPERATIONAL FIRES by Major Thomas A. Kolditz, USA, 51 pages.

This monograph examines several definitions for the operational fires concept, and traces the theoretical underpinnings of operational fires from both Russian operational theory and airpower theories.

The monograph then examines historical examples of the decisive use of operational fires. The examples are from 1960 to the present, and include Khe Sanh and Operation Thor in Vietnam, 1968, Operation Linebacker II in Vietnam, 1972, the Yom Kippur War in the Middle East, 1973, and Operation El Dorado Canyon over Libya, 1986.

An examination of United States Army, Navy, Marine, Air Force, and Joint doctrine on operational fires then provides the basis for analyzing the conditions under which operational fires are likely to have decisive impact on a campaign or major operation. These conditions are:

1. Detailed Pre-execution Planning
2. Aggressive Intelligence/Damage Assessment
3. Overlapping Tactical, Operational, and Strategic Goals
4. Limited Critical Infrastructure/Material
5. Complementary Capabilities
6. Synchronization
7. Centralized Control/Decentralized Execution

The analysis examines how each of these conditions may contribute to the decisive use of operational fires.

Table of Contents Page

I. Introduction.....1

II. Theoretical Underpinnings.....5

III. Historical Observations.....13

IV. Operational Fires Doctrine.....27

V. Integration and Analysis.....36

VI. Conclusion.....45

Endnotes.....47

Bibliography.....51

I. INTRODUCTION

Serving officers are paid to lead soldiers and to direct combat power on the field of battle. They apply two elements of combat power, fire and maneuver, to achieve decisive results. Under most tactical circumstances, fires support maneuver by suppressing or attriting an enemy force. This monograph investigates the conditions under which fires can be independently decisive.

At roughly the turn of the present century, warfare mirrored the rapid changes occuring in science and industry. Technological innovation such as the invention of rifled, repeating shoulder arms, indirect fire control techniques for artillery, slow burning smokeless propellants, and improved explosives multiplied the lethality of tactical engagement. Dense tactical formations provided a focal point for deadly fires, particularly defensive fires. Tacticians managed the surge in lethality by increasing the protection of their troops. Opponents separated themselves spatially. Armies maneuvered while the battlefield grew around a core filled less with men, but more with fires.

The expansion of the battlefield and a concomitant increase in the size of armies challenged the commander's ability to control his forces. Wars became difficult to conclude with a single battle. Commanders met the challenge by using staffs to plan the increasingly complex operations in detail. Such planning

staffs could sequence battles in both space and time, and thereby achieve victories unattainable through a single engagement. Such was the beginning of what modern military theorists call operational art.[1]

Current U. S. Army doctrine holds that operational art is, "the employment of military forces to attain strategic goals in a theater of war or theater of operations through the design, organization, and execution of campaigns and major operations."[2] The term "operational," then, refers specifically to the level of war between tactical fights and strategic goals. Simple tactical principles often do not apply at the operational level; elements of strategic design do not transfer unchanged to operational design. The operational level is unique.

One way to appreciate the unique qualities of the operational level of war is to compare how the U. S. Army organizes its major systems at the tactical and operational levels. Current doctrine places the various functions (at both levels of war) into comprehensive, hierarchical listings so that force designers can interpret, anticipate, and identify the needs of Army combat forces. Such program lists are organized into a "Blueprint of the Battlefield" that reflects systems that function on the battlefield.[3] For example, at the tactical level of war, the Army recognizes seven battlefield operating systems: maneuver, fire support, air defense, command & control, intelligence, mobility/survivability, and combat service support.

At the operational level, there are six operating systems: movement & maneuver, fires, protection, command & control, intelligence, and support. Even though the labels for the command & control and intelligence operating systems are the same at the tactical and operational levels of war, their subordinate functions and subfunctions are unique at each level.[4]

Operational Fires Defined

The subordinate functions of the tactical fire support and operational fires systems are unique at different levels of war. At the tactical level, fire support is, "the collective and coordinated use of target acquisition data, indirect fire weapons, armed aircraft(less attack helicopters), and other lethal and nonlethal means against ground targets in support of maneuver operations(emphasis added)."[5] Operational fires, in contrast, are not subordinate to maneuver:

> Operational Fires . . . [are] the application of firepower to achieve a decisive impact on the conduct of a campaign or major operation. Operational fires are by their nature joint/combined activities or functions. They are a separate component of the operational scheme and the coequal of operational movement and maneuver, but maneuver and fires must be integrated. Operational fires are not fire support, and operational maneuver is not necessarily dependent on such fires. However, operational maneuver can be affected by operational fires.[6]

Clearly, tactical fire support and operational fires are conceptually distinct.

Other military scholars offer alternative definitions. One excellent definition, derived from an Air War College research

project, emphasizes the functions of operational fires:

> 'Operational Fires' are fires which have a decisive impact on a campaign or major operation. They are integrated with maneuver at the operational level and usually serve one or more of three purposes. They overwhelm the enemy at critical points facilitating operational maneuver; they interdict enemy forces that have not yet joined the tactical fight; or they destroy critical facilities or functions that will adversely affect the enemy's campaign plan.[7]

An Operational Studies Fellow writing at the U. S. Army's School for Advanced Military Studies focused on the need for a specific commander's intent for operational fires:

> Operational Fires are defined as the application of firepower, often the product of coordinated joint and/or combined effort, directed by the operational commander as a fully integrated component of his campaign plan (operational concept), with design and intent to achieve a specified, high impact, operationally significant result through focussed intelligence and targeting and effective massed and/or precision fires.[8]

Each of these additional definitions retains a fundamental conceptual characteristic of operational fires, namely, that the operational commander directs his fires toward a "decisive impact" or an "operationally significant result." Operational fires hold the capability for an independent and decisive contribution to a campaign.

Despite the apparent consistency across the definitions, there have been few attempts to describe the principle conditions under which operational fires may be decisive. Similarly, there exists no assessment of the mechanisms by which operational fires produce their desired outcomes. By contrast, there is general

agreement on the principle conditions under which many maneuvers may be decisive. As a simple example, an operational flanking movement is likely to be decisive when the enemy is fixed (or otherwise lacks agility). Such a level of specificity has yet to be achieved with respect to operational fires.

The purpose of the present work, then, is to attempt to clarify when and why operational fires achieve decisive results. Operational fires may be decisive, but only under certain conditions; operational fires may be effective, but only in unique ways. The theoretical underpinnings of decisive fires, historical observations, and a review of current doctrine will serve as a basis for analyzing the when and why of operational fires.

II. THEORETICAL UNDERPINNINGS

There are at least three fundamental characteristics of indirect or air delivered fires (hereafter referred to simply as "fires") that distinguish them from direct fires. First, commanders can use fires independent of platform-to-target line of sight. Second, fires are highly adaptive to wide variations in terrain.[9] Third, fires can mass effects from delivery platforms that are more widely dispersed than direct fire platforms. These three characteristics are truly fundamental to fires, and are the result of considering the geometry of line of sight, plane of movement, and relative position.

The Army's serving Chief of Aviation, Major General J. David

Robinson, views fires as having the capability to maneuver, using the air as a dimension unavailable to ground maneuver forces. Robinson observes,

> Three things have changed in recent times to bring about a true maneuver capability in the third dimension. First, helicopters can fly and fight at night in the ground regime. Second, the artillery can move independently, shoot from dispersed locations and achieve the effects of mass at long ranges. Finally, intelligence systems now provide near-real-time, "actionable" information on high-payoff, short dwell targets.[10]

Recent advances in technology increase the effectiveness and the relevance of fires from the third dimension.

Early Theorists

The writings of classical military theorists are of limited use in the study of operational fires because the fundamental characteristics of fires require post-industrial technology. Students of military theory often attribute the first writings on fire support or indirect fires to the classical Asian theorist, Sun Tzu.[11] Although Sun Tzu does make brief mention of incendiary missiles, it is clear throughout his writings that by fire, he meant flame. The unique theoretical characteristic of modern tactical and operational fires is not that they cause flame or damage, but that they make full use of the third dimension of the battlefield--through direct delivery in the case of air weapons, and indirect delivery in the case of artillery, rockets, and missiles.

The theorist Carl von Clausewitz does not discuss

operational fires directly, but does refer to the destruction of infrastructure and logistics in the context of war.[12] Clausewitz writes, for example, "Such (activities) should always be regarded merely as means of gaining greater superiority, so that in the end we are able to offer an engagement to the enemy when he is in no position to accept it."[13] His discussion has only limited applicability in the operational fires area, because the attack of infrastructure and logistics is not fundamentally associated with fires from the third dimension. Infrastructure and logistics are simply where commanders typically direct such fires. Maneuver forces can also penetrate to destroy infrastructure.

The writings of classical theorists offer no clear basis for an exclusive focus on operational fires. Instead, a more useful theoretical basis for operational fires is reflected in two primary sources. The first sources are the writings of Russian military scholars. The second, more contemporary sources are air power theories.

The Russian Views

The Russians were among the first to recognize that artillery fires could be the decisive element in a campaign. During the Napoleonic campaigns of 1812-1814, artillery caused the greatest number of fatal casualties because its effects were massed. Initial efforts merely placed large numbers of artillery pieces into the tactical fight--640 Russian guns and 587 French field pieces in the Battle of Borodino, 1812, for example. In

1813 in the assault on Warsaw, the Russians massed 120 guns into a single "Grand battery."[14]

By analyzing the effects of massed artillery in the Napoleonic era, the Russians captured the notion of fires as the decisive element in operations. In 1831, Lieutenant-General Nikolay Aleksandrovich Okunev published Memoranda on the Change which Artillery Used Correctly Will Produce on Modern Grand Tactics. The operative phrase, of course, is grand tactics.[15] Okunev's work serves as the seminal recognition of decisive fires and is a clear antecedent of the modern Russian concept of fire superiority in operational design.

Military theoretician James Schneider points out that the movement of Napoleonic strategy toward operational art began when the battlefield expanded in space to adapt to changing demographics, politics, and lethal technology.[16] If Napoleonic battles grew to include more than one thousand field pieces massed at the decisive point, and if, as noted earlier, artillery accounted for the majority of fatalities, then it follows that the lethality of cannon fires were a key mechanism in the emergence of the operational level of war. Mikhail Tukhachevsky observed that the tactics of his day, "presupposed unobstructed movement separately at the outset, followed by the unimpeded concentration of forces for a general encounter under the most favorable conditions."[17] Decisive fires accelerated the development of operational maneuver by making such concentration impossible to

achieve without unacceptable casualties.

The kernel of truth uncovered by early Russian theorists grew into the Soviet Army's intense focus on the science of firepower. It represents the theoretical genesis of modern operational fires. It is not, however, the sole theoretical basis for contemporary doctrines that recognize decisive fires. A parallel and perhaps separate theoretical path followed the technological triumph of arming aircraft. Fires from the air--another indirect approach sharing many of the fundamental characteristics of indirect fires--engendered an independent theoretical effort to understand and harness the capabilities of operational fires.

Air Power Theories

If both surface to surface and air delivered weapons can be tools of the operational planner, it seems that air power theory might then apply in the more general context of operational fires. Indeed, many of the useful elements of air power theory lead to insights into the basic theoretical foundation of operational fires. In few instances does it matter that aircraft were the delivery means, versus guns or missiles. The technology of air and artillery delivery changes over time, as does the relative advantage of a three dimensional approach.

There is no single prescriptive theory on the use of air power. There are, nonetheless, two thinkers who have written extensively on the subject of how to use armed aircraft at the

operational level of war. One of these thinkers is a serving Air Force officer named John Warden, III. The other theoretician, and the first to be discussed here, was an artillery officer in the Italian Army named Giulio Douhet.

Douhet was commissioned in the Italian artillery in 1882 and began thinking about the combat utility of aircraft during the rise of air technology, around 1910.[18] His theoretical writings are often associated with the increasingly questioned virtues of strategic bombing and its effects on morale and national will. From the operational perspective, his ideas are robust and apply to most contemporary and emerging deep strike systems. Consider his assessment of the value of massing to attack, rather than prior to attack:

> A plane based at point A, for example, is a potential threat to all surface points within a circle having A for its center and a radius of hundreds of miles for its field of action. Planes based anywhere on the surface of this same circle can simultaneously converge in mass on point A. Therefore, an aerial force is a threat to all points within its radius of action, its units operating from their separate bases and converging in mass for the attack on the designated target . . .[19]

The principle is very similar to a fundamental characteristic of fires, namely the rapid achievement of mass at the target from widely dispersed delivery means.

The other fundamental characteristics of fires--independence from line of sight and adaptability to terrain--are also found in Douhet's work. He wrote of, "moving freely in the third dimension," and attacking the enemy in depth, "far behind the

fortified lines of defense without breaking through them."[20] If Douhet's notion of command of the air was, "to be in a position to prevent the enemy from flying while retaining the ability to fly oneself,"[21] it is reasonable to exchange "flying" and "fly" with similar forms of the terms, "shoot, launch, or deliver." The primary advantage of operational fires lies in the use of the third dimension--air. The applicability of a manned air delivery system is a present day technological tradeoff between factors such as flexibility and expendability.

Although Douhet's work has some utility as a start point for operational fires theory, his reasoning appears excessively influenced by his unabashed advocacy for the air arm as a singularly decisive force. His argument that the command of the air would lead to quick strategic victory and that land and naval forces (both offensive and defensive) were insignificant was as much a partisan "roles and missions" argument as it was a carefully thought out theory of war. Had technological insights allowed Douhet to focus on the potentiality of deep strike instead of merely the advantages of aircraft, his work may have been a more enduring contribution. Colonel John Warden, III, has refined many of Douhet's ideas and focused them at the operational level of war. Warden modifies Douhet's "command of the air" concept into the idea of air superiority, defining it as, "having sufficient control of the air to make air attacks on the enemy without serious opposition and, on the other hand, to be free of

the danger of serious enemy air incursions."[22] Warden's argument is simple. If one holds air superiority, one wins. Otherwise, one loses.

Warden's theory seeks to be operational, but is largely strategic. He lifts Clausewitzian terms, such as centers of gravity, into his framework but fails to distance himself from the advocacy of air weapons long enough to focus on operational design--targeting aside. Purely an air attrition theory, Warden's work emphasizes the patient and persistent degradation of the enemy's command and logistical systems, with victory the only possible outcome. What the theory lacks is an assessment of how land, air, and naval forces should interact to force a quick, decisive victory.

Specific circumstances do exist, according to Warden, when air power is likely to be the key force in campaign design. These circumstances are when:

> (1) ground or sea forces are of insufficient numbers to get the job done,
> (2) ground or sea forces cannot reach the enemy center[s] of gravity,
> (3) enemy ground forces can be isolated or delayed while air works directly against political or economic centers,
> (4) enemy power is confined to a small area, such as an island,
> (5) the commander can conduct an early campaign phase before land or sea forces become dominant,
> (6) if the military objective is the destruction of the enemy's war production capability, and
> (7) in some cases, time is not a significant constraint.[23]

If these are the circumstances when air delivered fires play the

primary role in campaign design, it follows that ground or sea launched fires may also play the primary role when they satisfy any or each of Warden's circumstances. Such logic will receive further scrutiny in later sections of the present work.

III. HISTORICAL OBSERVATIONS

The present section focusses on operational fires after 1960. Although there are excellent historical examples of operational fires earlier than 1960, there are several reasons to use modern examples. Technology plays a key, perhaps even preeminent role in the delivery of fires. It seems reasonable to seek out examples where relatively modern technology was available to the combatants. Trends in force structure also change over time. Examples where force structures roughly approximate those in use today are most appropriate. Lastly, by limiting the historical analysis to the last thirty years, the work may be of greater use to currently serving officers who seek to develop a practical sense of how operational fires may function for them.

One assumption underlying the practical value of theory is that good theories explain past events and help predict future outcomes. To understand which circumstances favor the decisive use of operational fires, it is important to look at instances where fires succeeded in that key role. Instances where operational fires may have failed to achieve a decisive result are equally important. Vignettes from America's war in Vietnam serve

to illustrate both outcomes.

Vietnam

War in Vietnam seems an unlikely resource for the historical study of operational fires. Lack of clarity in defining operational endstates and goals, problems matching force design and terrain, and a host of political restraints aimed at avoiding superpower confrontation limited maneuver forces to a largely tactical war of attrition. Tactics emerged wherein maneuver forces either located an enemy force, or lured it into a position where heavy tactical fire support augmented with direct fire could destroy it. General William Westmoreland became frustrated with commanders' unwillingness to engage the enemy except with overwhelming artillery and air support, and criticized the practice as eventually producing a "firebase psychosis" in the force.[24]

Senior U. S. commanders used fires in operational quantities, but the "means" linkage of these fires to an operational design was often weak. In January 1968 in Khe Sanh, approximately six thousand U. S. Marines were besieged by more than two divisions of North Vietnamese Army (NVA) regular troops--roughly 16,000-18,000 soldiers. Famous for their integration of tactical air, the Marines repulsed repeated attacks by the NVA, who were decimated by the 350 fighter and 60 bomber Navy and Marine air sorties that flew against the NVA forces daily during the two month course of the campaign.[25] The large number of

sorties would suggest that the effect was operational. In fact, these numbers more accurately reflect generous amounts of tactical air missions in support of a tactical defense.

The NVA, on the other hand, were using fires operationally. By April, the Provisional Corps - Vietnam (PCV) composed a counterattack, named Operation Pegasus, to effect the defeat of NVA forces that had surrounded Khe Sanh. The NVA long range artillery, however, continued to dominate a portion of the Demilitarized Zone (DMZ) east of Khe Sanh in the Third Marine Division area of operations (AO). Route 9 and the Cua Viet River running from the Third Marine logistical base at Dong Ha west to Khe Sanh were under continual threat of attack by NVA 122mm and 130mm guns and 152mm gun-howitzers.[26]

The NVA used superior firepower along the DMZ to create the advantage of operational protection in the Cap Mui Lay coastal region in the southeastern corner of North Vietnam. The air defense artillery and coastal batteries of the NVA denied U. S. forces the ability to perform aerial reconnaissance, and effectively prevented the positioning of U. S. ships within 20 kilometers of the coast.[27] The domination of the DMZ by NVA artillery created ideal conditions for NVA maneuver forces to mass in operational strength. The NVA thus developed the potential for a multi-division attack to turn the coastal eastern flank of the Marine defenders and roll west to Khe Sanh.

In May, the NVA launched a division-sized attack from Cap

Mui Lay, but were repulsed. The PCV intelligence assessment following the May attack suggested that the North Vietnamese were planning a two division attack in mid-July. Such an attack held strategic significance because of a potential link with the ongoing Paris Peace Talks. Fresh territorial gains by the NVA south of the DMZ could appreciably strengthen the North Vietnamese position at the bargaining table.[28]

In searching for ways to counter the NVA initiative, the PCV Corps Artillery found itself with poor targeting intelligence and overmatched by long range NVA artillery approximately four tubes to one. The PCV planning staff concluded that only the simultaneous, complementary use of artillery, naval gunfire, and fixed wing bombers could overwhelm the NVA's air defense capability and permit the PCV to conduct a focussed attack of NVA surface to surface assets. The PCV Corps Artillery developed such a plan, code named Operation Thor.

The concept of Operation Thor was to use passive target acquisition to locate the NVA batteries that were within eight miles of the DMZ. Once the NVA batteries were acquired, the towed 155mm and 8" howitzers of the 12th Marines (supporting the 3rd Marine Division) could then emplace well forward, under the protection of naval gunfire and Marine air. With NVA targets located and in range of 12th Marine artillery, both PCV artillery and Seventh Fleet naval gunfire would suppress NVA air defense positions to enable fighter bombers to execute attack runs with

bombs and napalm. Additionally, the longest range artillery and naval guns available would fire on NVA missile batteries capable of striking B-52s immediately prior to B-52 high altitude bombing runs. As these mutually supportive efforts succeeded and NVA air defenses crumbled, the plan was to exploit these effects by introducing increasingly aggressive aerial reconnaissance to provide battle damage assessment (BDA) and continual refinement of the target lists in repeated attacks on the NVA indirect fire and air defense systems.[29]

Although most of the planning for Operation Thor was done before April, 1968, joint coordination problems shelved the plan until the Commander, MACV ordered it executed in anticipation of the July multidivisional NVA attack. The tactical and logistical commitment for the operation was for a seven day effort. Seventh Air Force was to control the first two days of the operation, which consisted primarily of B-52 strikes. The remaining five days were under control of PCV. The command relationships and coordination channels for Operation Thor are at Figure 1. The generous assets reflect General Westmoreland's commitment to the operation. They included a carrier borne air group, all naval gunfire support ships from the committed task group, 210 B-52 and 350 fighter-bomber sorties reinforcing the already committed 1st Marine Air Wing, and the artillery of the 3rd Marine Division and PCV.[30]

The execution phase of Operation Thor began on July 1, 1968,

with three consecutive days of coordinated field artillery SEAD and B-52 strikes. By day 4, forward air controllers and air observers were able to adjust artillery fire or refine air attacks on targets of opportunity. The operation proceeded as scheduled,

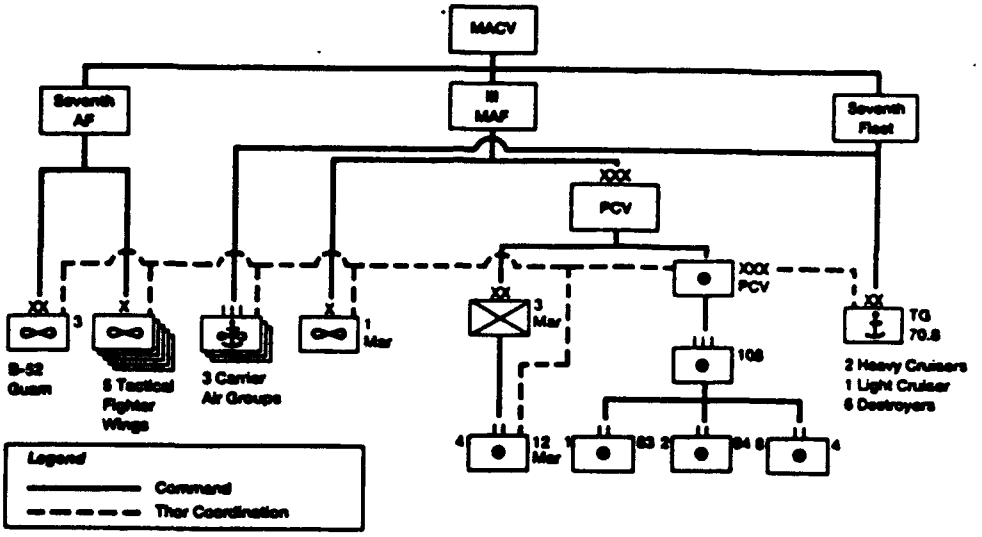

Figure 1. Operation Thor Command & Control[31]

and ended with naval gunfire support ships within 5 kilometers of the shore and observation aircraft flying deep into the operational zone.[32] At the cost of one U. S. serviceman killed and one wounded, the joint operational fires of Operation Thor destroyed 93 NVA field artillery systems and degraded enemy offensive capability to such a degree that there were no NVA ground attacks in sector for the duration of the Paris Peace

Talks.[33]

The NVA in the Cap Mui Lay region lost the initiative at the operational level of war when Operation Thor denied them the operational protection afforded by their air defense, coastal defense, and long range artillery. This protection was essential to effectively mass ground forces for a potentially decisive attack, and the NVA had dedicated considerable resources to the protection effort. Once the protection was lost, MACV was free to use fires to exploit the NVA force as a whole. Operation Thor clearly demonstrates the decisive effects one can derive from the simultaneous employment of complementary capabilities.

Operational warfighting without integrating complementary capabilities can be costly and ineffective. In December 1972, the U. S. Air Force executed a bombing campaign directed at the will of the North Vietnamese people. The operation, named Linebacker II, focussed on the infrastructure surrounding Hanoi, and supported the limited strategic goal of forcing the North Vietnamese into a cooperative bargaining posture at ongoing negotiations in Paris. Weather, threat of enemy interceptors in daylight, and other tactical considerations caused Linebacker II to use B-52 aircraft supported by USAF F-111s and Navy A-6s to conduct the campaign.[34]

During the initial days of the operation, North Vietnamese surface to air missiles (SAMS) succeeded in taking a toll on the attackers. On 18 December, 129 bombers flew missions, three were

shot down and two were severely damaged. On 19 December, 93 flew and two were damaged. On 20 December, of the 99 B-52s that flew, six were shot down and one received serious damage. On 27 January, Linebacker II ended; in the interim, SAMs destroyed two more B-52s.[35]

Despite the considerable damage to the North Vietnamese infrastructure caused by Linebacker II, the raids contributed to the NVA's strategic objectives by weakening the commitment of the U. S. citizenry to the war for at least two reasons. First, although the U. S. loss rates during Linebacker II were low in an absolute statistical sense, they were significant in that the supposedly helpless North Vietnamese damaged or destroyed sixteen U. S. strategic bombers--a psychological victory. Furthermore, U. S. Congressional leaders and most international leaders found the independent air operation so morally objectionable that both the House and Senate Democratic Caucuses voted to cut off all funds for Southeast Asian military operations (contingent upon prisoner release and the safe withdrawal of American troops).[36]

In a sense, then, the results of Linebacker II were decisive in favor of the North Vietnamese government. It underscores the complex and sometimes unintended effects that may accrue during the independent use of a single capability--in this case air. On January 23, 1973, President Nixon appeared on national television to read, "Ending the War and Restoring Peace in Vietnam: Address to the Nation."[37]

When juxtaposed with the ideal outcome of Operation Thor, Operation Linebacker II suggests that limited campaigns using a single arm may hold complex outcomes. Despite considerable electronic warfare capability, the Air Force found it difficult to achieve an appropriate level of operational protection. Even after achieving tactical success, the strategic and operational endstates suffered from the public's disapproval of the techniques employed. Surface to surface fires, used in the same fashion and in the same quantities, would probably carry the same liabilities.

The Yom Kippur War, 1973

The Vietnam case studies discussed above strongly suggest that operational fires can be decisive when complementary capabilities are employed simultaneously against a decisive point. The October 1973 war between Egypt and Israel illustrates both the futility of an unsynchronized effort and the effectiveness of a novel, synchronized blend of complementary capabilities.

On 1 October 1973, Lieutenant Benjamin Siman Tov, the order of battle officer for the Israeli Southern Command, composed and submitted an estimate that characterized the positioning of Egyptian troops for an alleged exercise as, in reality, a deployment for war with Israel. He submitted a second paper two days later that reinforced the findings of the first. Lieutenant Colonel David Gedaliah, the Southern Command Intelligence Officer, was unimpressed with the analysis, and omitted it from the Southern Command's Intelligence Report. By sundown the next day,

64 battalions of Egyptian artillery were in position to range beyond the Suez Canal.[38]

The artillery preparation on 6 October 1973 began with a simultaneous volley from over 2000 pieces of artillery and mortars; 10,500 shells rained on Israeli defensive fortifications at a rate of approximately 175 shells per second.[39] Simultaneously, more than 200 Egyptian fighters and fighter bombers crossed the canal to strike Israeli airfields and air defense positions. In the Soviet tradition, large numbers of infantry supported the fires by assaulting the Israeli side of the Suez Canal. The infantry deployed large numbers of anti-armor teams with Sagger missiles into several kilometers of Israeli territory east of the Canal. The Egyptians had won control of the first line of Israel's national defense.

Following the highly successful 1967 Arab-Israeli War (during which the Israeli Air Force destroyed most of the Arab air forces on the ground), the Israeli armed forces developed an emphasis on armor and tactical air at the expense of mechanized infantry and artillery.[40] The October 1973 Egyptian attack had insufficient momentum to be operationally decisive, but took advantage of the imbalance in Israel's force structure by pitting dismounted infantry and artillery against Israeli tanks in the East, covered by sophisticated Soviet-made SAM-2 and SAM-3 surface to air missiles in the West. Initial Israeli losses were heavy, and force ratios were intimidating. An Israeli tank brigade led

by Colonel Dan Shomron was outnumbered six to one in tanks, and twenty five to one in artillery tubes.[41]

The Egyptians were in a position to successfully defeat the Israeli Armed Forces with decisive fires if one of two outcomes were to occur. They would succeed if they could sustain the momentum of their air defense and artillery well into Israel, thereby neutralizing Israeli air power. They could also succeed if they fixed Israeli ground forces into a relatively static war of attrition, thereby leveraging the Egyptian dominance in artillery. They failed on both counts.

The Israeli armed forces used two basic forms of operational design to unhinge the Egyptian effort. Both forms shared the concept of using operational maneuver to support air-delivered operational fires. In the first technique, the tactically sophisticated tank forces of Israel would fix Egyptian forces outside their SAM umbrella to enable the Israeli Air Force to intervene with fires. This technique is reflected in the fate of the 1st Egyptian Mechanized Brigade, fighting south along the Gulf of Suez in the Ras Sudar region. The Israeli commander, General Gavish, used his armored force to fix the tanks and armored personnel carriers (APCs) beyond their SAM coverage, and the Israeli Air Force snuffed the entire Egyptian brigade.[42]

The second technique was conceptually similar to the approach found in Operation Thor in that it stripped the operational protection provided by Egyptian surface to air

missiles. Instead of artillery SEAD, however, the Israeli tank forces attacked SAMs directly. As one analyst observed, "As the armored forces on the West bank of the Canal destroyed one surface to air missile battery after another, the Israeli Air Force gained a freer hand and became a major factor in supporting the advancing Israeli forces."[43]

The Israeli Air Force's plans for war--which were to overwhelm Egyptian air defense initially, establish air superiority, and then support the ground campaign-- were changed when Egypt's preemptive attack of 6 October seized the initiative. Because Israel had reduced its artillery force structure, the Air Force had to apportion its assets between offensive counterair, close air support, and battlefield air interdiction. The resulting inability to mass sufficient amounts of artillery or air was costly to the Israelis, and prolonged the Yom Kippur War.

El Dorado Canyon

The next relevant historical vignette is the joint air attack conducted by U.S. Air Force and U.S. Navy aircraft on the Murat Sidi Bilal terrorist training camp and other selected targets in Libya. The attack, code named Operation El Dorado Canyon, consisted of a series of air strikes designed to damage Libya's state sponsored terrorist infrastructure, and to lend credibility to an aggressive U.S. posture with respect to terrorism. Because unclassified accounts of the action hold that it was purely an air operation, El Dorado Canyon appears to be a

case of the decisive application of operational fires.

In 1986, U. S. relations with Libya deteriorated in the wake of a series of aerial confrontations over the Gulf of Sidra. Following these confrontations, Libyan leader Moammar Gadhafi enlisted the assistance of the terrorist Abu Nidal to carry his battle to American noncombatants.[44] Libyan sponsored terrorists committed two bombings that set the stage for El Dorado Canyon. The first bombing, on 2 April 1986, killed four Americans on a Trans World Airlines 727 on final approach to the Athens International Airport. The second bombing, early on April 5th, destroyed the La Belle Club discotheque in West Berlin. An American sergeant and his Turkish girlfriend died, and 79 other American soldiers, relatives, and retirees were injured.[45]

Signals intelligence provided highly convincing evidence that the terrorists committed their acts at the direction of the Libyan government. On April 9, President Ronald Reagan charged General Bernard Rogers of the U. S. European Command (EUCOM) with the execution of El Dorado Canyon. Rogers, in turn, placed Sixth Fleet Vice Admiral Frank Kelso in command of the operation. The operational objectives for the attack were:

> 1) Bomb terrorist facilities in Tripoli: Aziziyah barracks, Murat Sidi Bilal Training Camp, Tripoli Military Airfield.
> 2) Bomb terrorist facility in Benghazi: Jamahiriyah barracks.
> 3) Suppress Libyan air defenses: bomb Benina military airfield, destroy air defense radar network.[46]

The operational objectives supported the broader strategic

objective: the destruction of the major known elements of Libya's terrorist command, training, and support infrastructure. The intent was to proceed quickly so that the attack would preempt, and perhaps discourage, further terrorist attacks against the United States.

At 0154 on 14 April, the Libyan coastal air defense radars attempted to illuminate attacking aircraft despite heavy jamming by Navy EA-6B Prowlers and EF-111 Spark Varks. Six Navy A-6 E Corsairs and six F/A-18 Hornets fired 48 antiradiation Shrike and HARM missiles to effectively silence the radars. Within minutes, 18 Air Force F-111 F aircraft streaked 100 feet above Libya at nine miles per minute, using Pave Tack targeting pods to accurately deliver both laser guided and radar-released bombs onto their targets. Fifteen A-6 Es dropped 500 pound Mk 82 bombs and 500 pound cluster munitions. In nineteen minutes, the raid was over. Two hundred thirty three bombs and 48 homing missiles had struck Libya. Only five bombs missed their targets.[47] Only one U. S. aircraft, an F-111, was lost.

The obvious destructive efficiency of the operation, combined with the lack of significant response from Moammar Gadhafi, points to the success of El Dorado Canyon. Despite its success, however, there remains some question as to how one can consider a nineteen minute air strike designed to prevent future terrorist attacks operational, rather than tactical. An earlier analyst writing about El Dorado Canyon correctly described the

situation as one where, "objectives across the operational continuum [tended] to coincide."[48] In the case of El Dorado Canyon, operational planners could closely link specific tactical events (the destruction of specific terrorist facilities) to strategic outcomes favorable to the U. S. (elimination of Libya's capability to conduct terrorism). Such linkage is operational art. The duration of the strike was immaterial.

Historical analysis cannot be the sole basis for examining the conditions under which operational fires may be decisive. Military doctrine melds historical analysis with contemporary capabilities to offer commanders insights into how future operations might proceed. An analysis of historical vignettes therefore has more practical meaning in the context of current and emerging doctrine. The next section of the present paper attempts such an analysis. Doctrine on the use and suitability of operational fires is not widely available. Nonetheless, each service holds some ideas about how their unique capability to strike targets will effect campaigns and major operations.

IV. OPERATIONAL FIRES DOCTRINE

Marine Corps Doctrine

Marine Corps doctrine provides an excellent start point for a discussion of operational fires. This is not because Marine doctrine addresses operational fires in detail. To the contrary, Fleet Marine Force Manual 1 (Warfighting) never mentions

operational fires. It does, however, provide a straightforward description of the approach to land warfare used by the Marines, as well as by most U. S. ground forces.

The Marine Corps concept for warfighting is, "based on rapid, flexible, and opportunistic maneuver(emphasis added)."[49] This position recognizes that a small force can defeat a larger force if the smaller force uses both space and time to its advantage, applying decisive superiority at the necessary time and place. If an enemy force loses its physical and moral cohesion because of the disruptive shock effect of maneuver, the physical destruction of the force is a secondary concern.

Both the size and the mission of the Marine Corps rules out the use of attrition as an approach to warfighting, and rightly so. Attrition "seeks victory through the cumulative destruction of the enemy's material assets by superior firepower and technology."[50] As the island-hopping campaigns of the Second World War demonstrated, attrition warfare pits strength against strength and is costly (in men and material) for both sides. The ideal operational end state-- quick victory with minimal casualties-- is antithetical to attrition warfare.

Marine doctrine considers firepower to be the basis for attrition warfare, and movement the basis for maneuver warfare. Attrition warfare attempts to destroy enemy forces and material faster than they can regenerate. Maneuver warfare seeks to attack the enemy from, "a position of advantage, rather than meet it

straight on. The goal is the application of strength against selected enemy weakness."[51] By definition, attrition warfare and maneuver warfare stand alone as independent concepts.

The Marine Corps' assertion that firepower is the basis for attrition warfare does not limit firepower systems to an attritive role. Deep air maneuver and surface to surface precision strike operations deliver ordnance from a third dimension "position of advantage." Fires can form the basis for a limited form of maneuver warfare, if they represent the decisive application of strength against an enemy weakness.

Returning to the case of El Dorado Canyon, the technologically sophisticated operational fires placed on Libya represented strength against weakness, delivered from a position of advantage. The effects appear to have been decisive. It would be ludicrous to suggest that the raid was 19 minutes of attrition warfare. Operational fires, under these particular circumstances, formed the basis of a "maneuver effect." Some may argue that air forces are maneuver forces and therefore do not deliver fires. It is true that a "maneuver effect" would have been more clearly attributable to fires if Tomahawk Land Attack Missiles (TLAMs), instead of manned aircraft, had struck the Libyan targets. In this specific case, President Reagan would not approve the use of RGM-109C TLAMs (the C version delivers a 1000 pound conventional payload) fearing subsequent technological compromise of a carefully protected nuclear delivery system.[52] In terms of the

effect on the enemy, it is doubtful that the terrorists who were hit on the Benina Airfield really cared whether A-6Es, TLAM-Ds, or Army Tactical Missile System (ATACMS) delivered the cluster munitions.

Long range missile systems offer great flexibility in the decisive execution of operational fires. Because the United States Navy controls the largest suite of technically advanced surface to surface missiles in the world, it is appropriate to now explore the Navy's doctrinal approach to operational fires.

Navy Doctrine

The U. S. Navy performs two strategic functions--sea control and power projection.[53] Both these functions require the Navy to maintain a significant capability to deliver surface to surface fires, on the seas as well as inland. Naval guns and guided missiles give modern navies the tools to conduct operational fires. Unfortunately, U. S. Navy doctrine acknowledges neither the operational level of war, nor a concept of operational fires.

> Naval power, when projected ashore, focuses on, the destruction or neutralization of enemy targets ashore . . . This includes, but is not limited to, targets assigned to strategic nuclear forces, building yards, and operating bases from which an enemy is capable of conducting or supporting air, surface, or submarine operations . . .[54]

The naval term for the application of this capability to defeat an enemy force is strike warfare. Strike warfare is not only suitable for a force oriented attack, but can also destroy critical infrastructure. Operationally useful ranges are possible.

Standoff Land Attack Missiles (SLAMs) may be ship or air launched, and possess delivery range of up to 120 nautical miles (nm). TLAMs, as discussed earlier, can range within approximately 700 nm of the launch platform and achieve the stealth inherent to its fast, low level flight path.

The U. S. Navy has more capability to execute operational fires than it has doctrine to guide its planning staffs, thus conditions are ripe for the development of future doctrine. There is a strong history of fire support in the surface Navy. Ships have responded to ground based observers and aerial spotters, most often from the Marine Corps or a sister service, because individual ships have no organic fire support element (much like U. S. corps artillery battalions). The U. S. Navy's capability to play a decisive role in land campaigns traditionally rests with air, so one might expect naval aviators to take the lead in capturing ideas about operational warfighting with fires. At present, however, the best available source of fires doctrine for the Navy is doctrine for joint fire support.[55] Unfortunately, joint doctrine is only slightly more developed in the fires area than is naval doctrine.

Joint Fires Doctrine

The first true joint fires doctrine appears in the final draft of Joint Publication 3-09, Doctrine For Joint Fire Support.[56] Although this publication is currently on hold awaiting the resolution of several issues in joint operations,[57]

it is a major step forward in understanding how operational fires may fit into a campaign plan. It establishes three classes of joint fires--interdiction, joint fire support, and service fire support--and makes clear that both interdiction and joint fire support are directly responsive to the Joint Forces Commander (JFC). As such, interdiction and joint fire support can have a decisive effect on a campaign or major operation. These two classes of fires are clearly operational in scope.

Joint Pub 3-09 clarifies that joint fires are the responsibility of the Joint Forces Commander, and sets forth general tasks that joint fires may accomplish:

> 1) Facilitating maneuver to operational depth,
> 2) Isolating the battlefield by the interdiction of uncommitted enemy forces,
> 3) Disrupting or destroying critical functions and facilities that have operational significance, and,
> 4) Protecting portions of the area of operations when economy of force is necessary.[58]

Task number 3 is the task under which fires would be most likely to have a decisive impact on an operation. It also corresponds most closely to the Navy's definition of strike warfare. Tasks 1 and 4 are traditional fire support functions, which may occur at the operational level to facilitate operational maneuver. Task 2 essentially represents manned or unmanned interdiction, and could occur at any level of war--strategic, operational, or tactical.

Current joint fires doctrine neither limits nor specifies conditions under which fires might be decisive. The JFC, with the assistance of a planning staff and perhaps a Joint Force Fires

Coordinator (JFFC), must coordinate fires in time, space, and purpose to achieve the JFC's envisioned intent. Current joint fires doctrine also appears to distance itself somewhat from describing the use of aerospace forces. This is remarkable given the significant role that the Joint Force Air Component Commander (JFACC) plays in targeting decisions and in the overall design of a campaign.

Currently the Joint Publication 3-03 Doctrine for Joint Interdiction Operations is in a test version only, and is unlikely to become available in a final draft in the near term. At present, the best source of doctrine pertaining to interdiction and the use of aerospace forces to apply fires is in U. S. Air Force doctrine.

Aerospace Doctrine

Before attempting to describe aerospace doctrine in the present work, it should be made clear that U. S. Air Force does not consider the delivery of "fires," operational or otherwise, to be a valid aerospace mission. A senior Air Force doctrine writer recently remarked to his Army counterpart that, "the Air Force doesn't do fires, Boy Scouts do."[59] The remark, in addition to reinforcing unproductive interservice rivalry, underscores two important themes that, rightly or wrongly, seem to pervade aerospace doctrine.

The first theme is that the air arm plans and executes its attacks as a maneuver arm, massing against an enemy vulnerability

and attempting to bring combat power to bear at a decisive point in space or time. Attrition warfare is an inefficient use of any form of combat power, to include airpower.

The second theme reflects the concept of airmindedness. Airmindedness is a term coined by General Henry H. "Hap" Arnold to describe an airman's perspective on war. Presumably this perspective is unique because it, "reflects the range, speed, and capabilities of aerospace forces, as well as threats and survival imperatives unique to airmen (emphasis added)."[60] This is important because when Hap Arnold coined the term, the capabilities of manned aircraft and unmanned missiles did not overlap significantly. Now they do.

Thus to properly plan and execute synchronized operational fires, the JFC must integrate common sea, air, and land component capabilities, but using service specific doctrines and terminologies. For operational fires to be decisive, it is likely that the JFC's initial planning guidance must reflect such an intent. If not, the JFACC planning staff, the JFC's Joint Targeting Board (JTB), and the staffs of the other component commanders cannot integrate their service specific capabilities. This is particularly true under conditions where near term budget decisions may hang on a service or system's contribution to the fight.

The key elements of aerospace doctrine mirror the fundamental characteristics of fires discussed earlier in this

paper. Air Force doctrine on the nature of aerospace power points out that, "elevation above the earth's surface provides relative advantages over surface-bound forces." It also recognizes that "aerospace power can quickly concentrate on or above any point on the earth's surface." Finally, "aerospace power can apply force against . . . an enemy's political, military, economic, and social structures simultaneously or separately. . . It can be coordinated with surface power or employed independently."[61]

The first tenet of aerospace power is "centralized control/decentralized execution."[62] While all of the tenets seem relevant to the decisive employment of operational fires, this first tenet seems the most fundamental. It closely corresponds to the fifth principle of organizing cannon and rocket artillery for combat, namely, "maximum feasible centralized control." Artillery organizations for combat reflect tactical requirements, so it makes sense that the span of control required at the operational level would dictate a "decentralized execution" caveat in aerospace doctrine. Such a caveat in the operational fires area makes sense as well, particularly when interservice assets deliver joint fires. Planning, however, must remain centralized.

The most relevant point of departure between aerospace and emerging operational fires doctrine is in the Air Force's primary and most important mission--aerospace control. Aerospace control enables both land and air forces to operated freely and effectively, and denies a similar advantage to the enemy. Any

platform that delivers fires benefits from aerospace control. Most operational fires weapons require aerospace control near the point of launch, but not necessarily at the point of delivery. Aircraft are largely inefficient unless they achieve aerospace control at their base, enroute to target, and particularly at the point of target engagement.

Like the airpower theories discussed in Section II of the present work, aerospace doctrine has much to offer the study of operational fires. Whether or not the Air Force recognizes the term "fires" is irrelevant if actions in theater suggest that manned or unmanned deliveries have similar or identical effects. This is particularly significant under high threat conditions where unmanned systems may prove highly economical for both target engagement and battle damage assessment. Theory and doctrine demonstrate several threads of continuity among the services in the application of operational fires. In addition, the historical vignettes help show how those threads of continuity endure across circumstances. The fifth and final section of the present paper proposes seven conditions that appear to be necessary for conventional operational fires to play a decisive role in campaigns or major operations.

V. INTEGRATION AND ANALYSIS

Any attempt at rigorously defining a set of necessary and sufficient conditions for success in warfare will be met with

failure. Likewise, no set of conditions can guarantee the success of operations consisting primarily of fires. At all levels of war, the effects of fires may be transitory because of the ability of the enemy to regenerate his force or avoid detection in the first place. Under similar circumstances, the effects may appear permanent because of psychological or organizational changes in the enemy brought about by the attack. The business of predicting the effects of fires is not hard science; it is about probability, about possibility, about serendipity. In many ways, the effect of maneuver is equally uncertain.

Despite the uncertainty inherent in military art, there are consistencies that emerge during the study of decisive operational fires. These consistencies are not sufficiently mature to warrant being called principles, tenets, imperatives, or the like. They are, instead, areas that deserve further scrutiny.

The following conditions appear during most instances in which operational fires achieve independently decisive results:

1) Detailed Pre-execution Planning
2) Aggressive Intelligence/Damage Assessment
3) Overlapping Tactical, Operational and Strategic Goals
4) Limited Critical Infrastructure/Material
5) Complementary Capabilities
6) Synchronization
7) Centralized Control/Decentralized Execution

The conditions appear in a chronology that roughly corresponds to a mission planning sequence, and are not listed in order of importance.

Detailed Pre-execution Planning

The execution of any major operation requires detailed planning to ensure that the JFC's intent is met. In the case of joint fire support, the JFFC coordinates an initial joint fires plan based on his estimation of the JFC's available assets. The focus is on how those assets can best be used to support the maneuver concept of the operation. The JFC reviews this fires estimate as a part of the approval process prior to the selection of a course of action.

If the intent is for fires to be independently decisive, the staff must modify the joint planning process. As in Operations Thor and El Dorado Canyon, the delivery of fires must be the basis for course of action development. Rather than limiting fire planning to the normal targeting process and delegating it to a Joint Targeting Board, the primary staff must take a lead role in the initial phases of planning. Without such top fed emphasis, it is unlikely that the separate air, sea, and land component planning staffs will completely synchronize their efforts.

The 1973 Yom Kippur War underscores the liability one assumes if enemy activity prevents the execution of a detailed plan. The Egyptians denied the Israel the ability to execute preemptive strikes, and firmly held the initiative until costly combined arms activity put the Israeli plan for air superiority back on track.

Planning is possibly more critical for decisive fires than for decisive maneuver, because once the plan is in the execution

phase, major changes are difficult to invoke. By the time fires are actually executed, logistical activity, movement, and maneuver to support the fires has already occurred. Flexibility may be planned by ensuring alternate targets for each system--even some unmanned vehicles have the capability for multiple targeting--but the overall effort cannot respond to a last minute change in intent to the extent that a maneuver force might.

Aggressive Intelligence/Damage Assessment

The systems that deliver operational fires vary in their requirements for target location, and in their capacity to conduct battle damage assessment. Ideally, all systems would refine target location, conduct battle damage assessment, and initiate a reattack cycle as necessary. Under most threat conditions, even manned aircraft will not remain in the target area long enough to accomplish more than one of the three functions. Operational fires are highly dependent on accurate, continuous intelligence.

In some cases, notably Operation Thor, early phases of the operation may focus on the development of battlefield surveillance and target acquisition. In many instances, the support of national intelligence assets may ensure good initial assessments. Whatever the mechanism, it is clear that the operation will require precise targeting information at some point in time. This also means that if the defeat of highly mobile or fleeting targets is a significant part of the operational goal, planners must consider the widest possible range of engagement options.

Overlapping Tactical, Operational, and Strategic Goals

Simple efforts are more likely to succeed than more complex efforts. The purpose of operational planning and execution is to ensure that tactical events find a path to strategic success. The shorter or more coincidental the path, the greater the likelihood for a decisive outcome.

In the examples discussed earlier, either tactical and operational, or operational and strategic, goals were closely related. In the Yom Kippur War, the tactical envelopment and air to surface destruction of the Egyptian air defenses did more than assist the Israeli Air Force. Those events established the operational freedom of action a nation accrues through aerospace control. In El Dorado Canyon, the limited strategic objectives nested in the airfields and camps that supported the terrorists. When the attack destroyed the camps and their occupants, it became impossible for Libya to invoke international terrorism as a strategy.

Limited Critical Infrastructure/Material

Operational fires will be most effective when the enemy has formed a critical military or civilian infrastructure, but has a limited capability to reestablish or sustain damage to that infrastructure. In Operation Thor, the NVA air defense infrastructure created a means of operational protection that enabled the massing of ground forces. There was, however, little depth to that system in terms of immediate reinforcement or

replacement. Its elimination was decisive. Libya's limited capability to repair or replace air defenses and terrorist Il-76 Candid transport aircraft was a distinct operational vulnerability.

In future mid-intensity conflicts, industrial nations with robust military structures will be less vulnerable to decisive operational fires than emerging nations. Emerging nations have less ability to reconstitute quickly, and are likely to have fewer redundant military capabilities when compared to more developed countries. In a high intensity conflict, U. S. forces might face a large army with considerable redundancy in its tactical capability. In such a case, operational fires must assume an important supporting, rather than independently decisive, role.

Low intensity conflict (LIC) is another instance where operational fires are unlikely to be independently decisive. If the enemy does not rely heavily on material systems or infrastructures, then the targeting process to translate operational goals into fires will be difficult, perhaps impossible. The theory, history, and doctrine examined in this paper focused on conflicts of medium intensity between regular forces. Even Libya's vulnerability was primarily its active duty air defense network. The applicability of operational fires in LIC requires further investigation and analysis.

Complementary Capabilities

In every instance of decisive operational fires discussed in

this paper, planners blended the effects of complementary weapon systems to achieve the operational end state. Single weapons and, to a great extent, single services trade specialization for vulnerability. Without mutual support, efforts to overcome diverse networks of defense often fail.

The application of systems with complementary capabilities permits the planner to pit friendly advantages against enemy vulnerabilities. Success against one enemy vulnerability may set the conditions for a complementary weapon to attack a second vulnerability, and so on. Thus the attack becomes an iterative process of defeating enemy vulnerability from a position of advantage--a characteristic of maneuver warfare. Contrast that situation with one of attrition warfare, where enemy and friendly strengths gradually wear one another to the point of capitulation. Complementary capabilities permit planners to avoid attrition warfare. It is doubtful that operational fires could ever be decisive if attrition was the primary mechanism used to defeat the enemy.

Synchronization

In the present context, synchronization is the delivery of fires in time, space, and purpose to produce maximum relative combat power at the decisive time and place.[63] If the operational goal is the elimination of some enemy capability, the decisive "place" may be theater wide. Conversely, if the operational goal is the destruction of a specific symbolic target (as was the case

in a recent TLAM strike on an Iraqi industrial site), the decisive place might be a single point on the ground.

In operational fires, mass and synchronization are not independent concepts. Operational fires have tremendous flexibility, and can mass at decisive points without the vulnerability of massing delivery platforms. Without synchronization, however, mass may not be achievable. Precision weapons or "dumb" weapons in large quantity most often form the basis of operational fires. Mass is easiest to achieve with such resources by pooling joint assets. This will only occur if commanders and staffs have a thorough understanding of all services doctrine, major systems, planning processes, capabilities, limitations, and procedures.

El Dorado Canyon is an excellent example of synchronization. In less than twenty minutes, dozens of high performance aircraft from two services struck multiple targets with hundreds of bombs and missiles. A flawlessly synchronized logistical effort assisted in fueling and protecting the combat aircraft enroute to their targets. In addition to the material damage the Libyans suffered in the attack, the psychological effect of the near simultaneous destruction of a national offensive capability must have been devastating.

Centralized Control/Decentralized Execution

The condition of centralized control/decentralized execution is derived from aerospace doctrine. It reflects the practical

aspects of massing effects that can cross operational level boundaries in a very brief period of time. Centralized control enables the synchronization already discussed. It permits operational fire planning to proceed with a common set of priorities. It reduces the possibility that objectives will be unclear or will conflict.

Centralized control does not mean that a particular service needs to command the entire operation. In Operation Thor, the first two days of the operation were planned and executed primarily by the staff of the Seventh Air Force. The remaining five days of the operation were left under the control of PCV. At all times, the MACV was in a position to set priorities, establish responsibility, and allocate resources.

Decentralized execution of operational fires holds at least three advantages for the JFC. First, decentralized execution helps commanders achieve effective spans of control over a large number of technically sophisticated target acquisition and delivery assets. Second, it makes the entire system more responsive because it puts a decision-maker in the closest possible proximity to the hardware assets that physically execute the plan. Finally, decentralized execution allows tactical flexibility. Tactical flexibility permits the unique capabilities of each system to be realized, and also reduces the vulnerability of the force as a whole.

VI. CONCLUSION

Operational fires offer the commander a responsive, effective means for defeating the enemy in campaigns or major operations. By this time it should be clear that the predominance of fires in an operational design does not change many of the planning fundamentals. In one sense, the employment of operational fires complicates the planning process by demanding that commanders and their staffs consider three, rather than two, dimensions of force application.

Doctrine to guide commanders in the effective use of operational fires is in its infancy. There is considerable work to be done, particularly in the area of reconciling aerospace doctrine and joint fire support doctrine. Contentions that certain effects are "platform peculiar" are arguments for budget considerations, not carefully thought out analytical positions. Joint doctrine writers must focus on complementary interservice capabilities and how best to weave them into a warfighting force.

The analysis of selected cases of decisive operational fires reveals reasonably consistent patterns in the conditions that accompany such fires. As one might expect, many of the conditions that favor decisive operational fires also favor other decisive force application, such as operational maneuver. Technological advances are unlikely to subjugate basic warfighting skills or approaches. Generals will continue to assess enemy vulnerabilities, plan, control and mass forces, synchronize a

variety of capabilities, and deliver combat power.

If the technology gap between the U. S. military and its likely opponents widens, operational fires may offer a quick, decisive solution to problems that are definable in military terms. If the gap continues to decrease, operational fires may simply expand the depth and lethality of future conflict. Whatever becomes of the technology gap in the near term, the three dimensional view of the battlefield is, at present, the high ground. The key to success on the battlefield is the deadly, creative application of the tools that technology provides. Commanders who win wars will fight with the full potential of fires.

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61. Air Force Manual 1-1, vI, Basic Aerospace Doctrine of the United States Air Force (Washington, DC: Headquarters, U. S. Air Force, March, 1992), p. 5.

62. Ibid., p. 8.

63. Joint Publication 3-09, p. 1-10.

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